L. STEVENS.

Gas Apparatus.

No. 45,568. Patented Dec. 20, 1864.

Fig. 1.

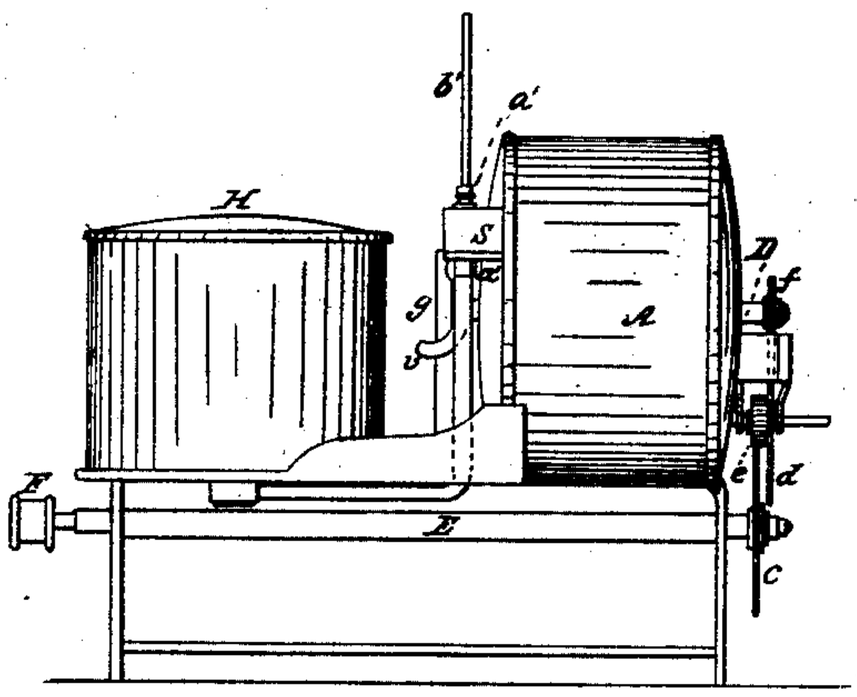



Fig. 2.

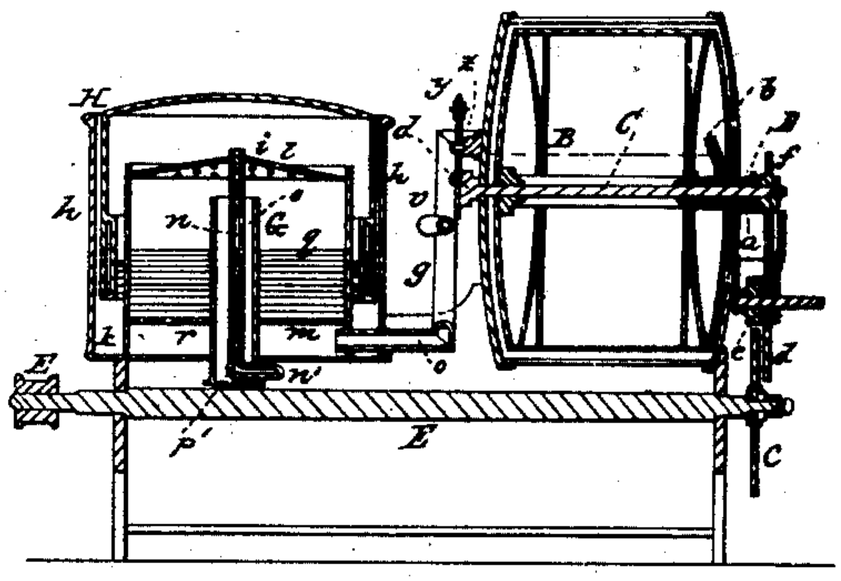
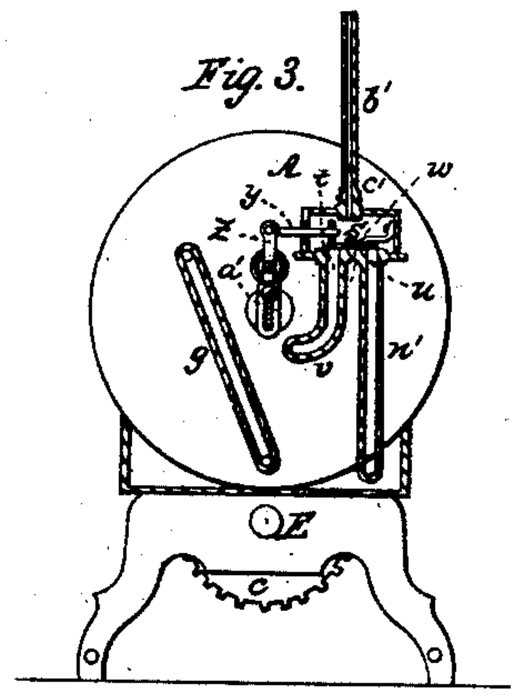



Fig. 3.

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# UNITED STATES PATENT OFFICE.

LEVI STEVENS, OF FITCHBURG, ASSIGNOR TO HIMSELF AND JOHN D. SARGENT, OF BOSTON, MASSACHUSETTS.

## IMPROVED APPARATUS FOR VAPORIZING AND AERATING VOLATILE HYDROCARBON.

Specification forming part of Letters Patent No. **45,568**, dated December 20, 1864.

*To all whom it may concern:*

Be it known that I, LEVI STEVENS, of Fitchburg, in the county of Worcester and State of Massachusetts, have invented a new and useful or Improved Apparatus for Vaporizing and Aerating a Volatile Hydrocarbon; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 denotes a side elevation, and Fig. 2 a longitudinal section, of it. Fig. 3 is a transverse section taken through the flowage-regulator making part of my invention, and to be hereinafter described.

The nature of my invention consists in the combination of a flowage-regulator for the purpose hereinafter explained, with an apparatus for vaporizing and aerating a volatile hydrocarbon, the said regulator being made to receive the hydrocarbon from a reservoir, and to operate substantially as hereinafter described.

And my invention further consists in the said flowage-regulator as made, substantially as hereinafter described, and with its inlet air-pipe either stationary or adjustable, as explained.

And my invention further consists in an improved hydrocarbon-vaporizer, constructed substantially as hereinafter described, in order that the liquid and aerial currents may be caused to flow in opposite directions through it, and in contact with each other, as hereinafter explained.

And my invention further consists in the arrangement of the said vaporizer with a gasometer, or the combination of the two, substantially in the manner as hereinafter set forth.

For the purpose of vaporizing a liquid hydrocarbon and aerating it, or mixing air with it in order that the mixture of air and vapor may be burned as gas is ordinarily used, either for illumination or for the production of heat, there have been various kinds of apparatus invented, among the most prominent and useful of which, in all probability, is that patented on May 6, 1862, by Oliver P. Drake.

My improved or new apparatus, like that of the said Drake, contains an air forcing or blast apparatus, combined with a vaporizer, and in carrying out my invention either the peculiar air-forcing or blast apparatus, as explained in the said Drake's patent, may be employed, or any other which will produce the proper effect may be substituted.

The accompanying drawings of my invention exhibit the air-blast or forcing apparatus as composed not only of a hollow cylinder or case, A, but of a gas-meter wheel, B, arranged within such case, such wheel having mechanism for putting it in rotation within the case.

The shaft C of the meter-wheel extends axially through the case A, and also through an air-inlet box, D, which has an air-opening, *a*, and a pipe, *b*, the latter being extended into the meter-wheel and so as to rise above the level of the water or liquid to be contained therein.

A shaft, E, on which is a barrel, F, (from which a weight is to be suspended by a chain wound on the barrel,) is connected with the meter-wheel shaft *c* by a train of gears. (Shown at *c d e f* in Figs. 1 and 2.) By the falling of the said weight the meter-wheel will be put in slow revolution within its case, and will draw air into the said case and expel it therefrom, and into the lower part of the vaporizer G, through a pipe, *g*, leading from the case A, and into the said vaporizer.

The vaporizer G is arranged concentrically within a gasometer, H, consisting of a cistern, *h*, and an inverted bell, *i*, the two being constructed and applied together in the usual manner. The annular space *k* between the vaporizer G and the cistern is to hold water in which the bell *i* is to enter and float.

In the construction of the vaporizer, both its top *l* and bottom *m* of its case *z*, (which is a tub or vessel closed at its bottom and open at top,) are to be foraminous, and it is to have two pipes, *n o*, arranged concentrically within it and with respect to each other, as shown in Fig. 2. The tubular space *p* between the two pipes opens out of the interior of the vaporizer, and is for discharging the mixture of vapor and air into a conduit, *p'*, by which it is to be conducted from the apparatus to the burner or burners, where it is to be enflamed.

The inner tube *n* continues up to and opens through the foraminous top *l*, and is for discharging the hydrocarbon liquid directly upon the said top, which, being conical, allows the

liquid to flow radially from the tube, and fall through the numerous perforations of the top *l* in fine streams, and on strata of cloth *q q*, piled on the perforated bottom *m*. There is below the said bottom *m*, and constituting part of the vaporizer, an air-chamber, *r*, into which the pipe *g* leads.

The air forced into the chamber *r* will rise through the cloths *q q* and come in contact with the hydrocarbon liquid contained in them and that falling from the top plate, *l*, and will vaporize the same, and with the vapor, or "gas," as it is frequently called, will pass into and through the pipes *p* and *p'*.

The surplus of air and vapor produced at any time over what may be removed by the burner or burners will remain in or flow into the gasometer, or the bell *i* thereof, which will serve not only as a means of storing the mixture, but to produce pressure necessary to force it through the burners and out of the vaporizer.

The next portion of my apparatus or invention is the flowage-regulator, the purpose of which is to regulate the flow of the liquid hydrocarbon from a reservoir into the vaporizer. This flowage apparatus consists of a close vessel, *s*, provided not only with two valve-seats, *t u*, on its bottom, but with a valve, *w*, to slide in the vessel and on such seats. A pipe, *v*, leading from a reservoir of the hydrocarbon fluid, opens with the vessel *s* through the valve-seat *t*. The pipe *n'*, hereinbefore mentioned, leads from the vessel *s* through the valve-seat *u* and into the central pipe, *n*, of the vaporizer. The valve *w* is long enough to close both parts of the seats and has its stem *y* extending through the side of the vessel *s*, and jointed to a lever, *z*, into a slot of which there projects the wrist of a crank or cranked wheel, *a'*, which is fixed on the shaft *c* of the meter-wheel of the air forcing apparatus. During each entire revolution of the meter-wheel the valve *w* will be moved forward and backward so as to alternately close and open each port of the valve-seats, each one of which (ports) will be entirely closed while the other is open to any extent.

A vertical air-inlet pipe, *b'*, extends through the top of the vessel *s* and down into such vessel. This pipe may be so applied to the vessel as to be capable of being slid vertically within a stuffing-box *c'* or its equivalent, such pipe being open at both ends. This pipe *b'* not only performs the function of admitting air into the vessel *s*, but serves to regulate the amount of fluid which such vessel may contain or receive, for the air within the vessel and above the lower end of the pipe will prevent the fluid from rising much above the said lower end. Consequently the more the pipe is depressed within the vessel the less will be the amount of fluid which will flow into it while the valve-port of the seat *t* may be open. Thus the air-pipe, in connection with the vessel *s*, the valves, and its ports, becomes a means of regulating the flowage of the liquid into the vaporizer. Were it not for the pipe *b'* the liquid would not readily escape from the vessel *s*.

One of the products obtained from the distillation of petroleum is a colorless liquid having an ethereal odor and being the lightest in specific gravity of all known liquids. This material is known now in commerce by the term "gasoline." By the automatic operation of my improved apparatus, and without the employment of other than ordinary atmospheric temperature, such a product may readily be converted into a dense gas or combustible vapor, and be combined with a sufficient quantity of atmospheric air in order to produce, while on fire, a brilliant and luminous flame, or one productive of great heat as circumstances may require.

A flowage-regulator to gage or determine the amount of the fluid passing from time to time into the vaporizer is an addition to the apparatus of great value and importance.

I claim as my invention the following—that is to say:

1. The combination of a flowage-regulator, for the purpose hereinbefore explained, with an apparatus for vaporizing and aerating a volatile hydrocarbon, the said regulator being made to receive the hydrocarbon from a reservoir, and to operate substantially as hereinbefore described.

2. The flowage-regulator made substantially as hereinbefore explained, and with its inlet air-tube either stationary or capable of being adjusted in manner and for the purpose as set forth.

3. The improved hydrocarbon-vaporizer, constructed substantially as described, with the chamber *r*, the foraminous plates *l* and *m*, and the pipes *n o*, arranged and combined together, and with the surrounding case or vessel *z*, in which they are placed, substantially as described.

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Witnesses:

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